Workshop Synopsis:

Lessons and Key Issues — Agricultural Technology Development and Transfer Collaborators Workshop

June 28–30, 1993
Washington, D.C.

Division of Food, Agriculture, and Resources Analysis
Office of Analysis, Research, and Technical Support
Bureau for Africa
U.S. Agency for International Development

The Workshop

Over 75 people participated in the Agricultural Technology Development and Transfer (TDT) Collaborators Workshop, held June 28–30, 1993, and sponsored by the USAID Africa Bureau's Office of Analysis, Research and Technical Support; Division of Food, Agriculture, and Resources Analysis (AFR/ARTS/FARA). Participants included representatives of international research centers, U.S. universities, African public research institutes, the World Bank, the Special Program for African Agricultural Research (SPAAR), and USAID field and Washington offices.

The workshop had two main goals:

1) to collect and extend recent findings in technology development and transfer in support of sustainable development, and
2) to identify key analytic issues to be addressed as part of USAID's continuing commitment to promote technology development and transfer in Africa.

The workshop catalyzed new awareness of agriculture's key role in economic development and of the critical roles that technology development and dissemination play in actualizing this vision. Participants in plenary and small group sessions assessed the impact and availability of agricultural technology, as well as the institutional structures within which technology is developed and disseminated. The workshop presented strong and exciting empirical evidence on the impact of investments in agricultural research in Africa, technology availability and needs, and the condition of research institutions. The empirical evidence is summarized in four findings.

The conference also reached consensus on four priority issues to be addressed in both USAID's technology development and transfer activities and the related activities of International Agricultural Research Centers (IARCs), National Agricultural Research Systems (NARSs), and donors.

The Role of Agricultural Technology Development and Transfer in Supporting Sustainable Development in Africa

Agriculture is crucial to Africa's development for two main reasons: 1) its current importance as a source of employment, food security, foreign exchange, and raw materials; and 2) its potentially powerful contribution to economic transformation and sustainable growth.

In his keynote address to workshop participants, Edward Jaycox, Vice President for Africa at the World Bank, highlighted the importance of the agriculture sector in supporting economic growth in Africa. The World Bank projects that, to achieve modest growth in income and employment, African economies will need to grow 4 to 5 percent per annum over the next decade. The primary source of growth can only be agricultural production, which the Bank targets to increase by 4 percent per year. Such output growth can only be achieved through substantial gains in productivity.

Sustainable development in Africa will require the increased use of profitable and sustainable agricultural technology that helps farmers, processors, marketing agents, and policy makers to address on- and off-farm constraints and to accelerate transformation. The flow of technology to and within Africa to meet future needs will require an enabling environment that promotes the collaborative efforts of public and private national, regional, and international organizations. The supply of technology will need to be sharply focused on themes and commodities with the prospects for broad-based improvements in income and food security. These efforts must be led and supported by Africans.

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Agricultural transformation—the process by which agriculture shifts from being dominated by highly diversified, subsistence-oriented production toward more specialized production dependent on markets—is itself a powerful catalyst for wider economic development. Economic development is generally fueled by resource transfers from agriculture to other sectors of the economy. Increased agricultural productivity is the most effective way to generate these resources. (The alternative, government intervention to extract resources, has harmed both agriculture and economic growth in many African countries. Policy reforms that support the growth of markets will be difficult to sustain without agricultural productivity increases. Technology development and transfer is key to increasing agricultural productivity.

Findings

1. Agricultural Research Pays Off.

Contrary to the prevailing "conventional wisdom," African agricultural research is a good investment with high rates of return. Recent studies show that agricultural research made substantial contributions to increased growth and income in Africa in the 1980s, during a time when policy distortions, economic crisis, and high population growth rates created a difficult climate for technology development and dissemination. Current moves toward policies more favorable to market-oriented growth offer hope for significant gains if effective technologies are developed and disseminated.

2. Markets Matter.

Successful technology adoption occurs when there are functioning markets into which increased output can be sold. Markets can be local, national, or international. Where well-functioning input and credit markets exist, new technologies can generate increased employment and income in both the agricultural and nonagricultural sectors. Greater attention needs to be paid to understanding cross-market linkages, to improving market operations, and to developing more effective ways of linking market demands to research and technology development.

3. Technologies Exist—But Not Enough.

Available technologies can increase agricultural productivity significantly and can be adopted by producers, marketing agents, and processors in response to changing economic conditions and emerging market opportunities. However, these technologies do not address all key constraints, and they apply to differing time frames. In some crucial areas—for example, environmental management and sustainability—sustainable technologies are expected to make their major impact in the first decade of the 21st century. Thus, continued investment in technology development and transfer is essential.

4. Institutions in Crisis.

At a time when it is both important and promising to push for the development and dissemination of technologies to support sustainable growth, the research institutions that must be the bedrock for any such initiative are themselves in a state of crisis. Many African public research institutions face serious funding, management, and personnel problems. Developing effective, sustainable agricultural research systems is a major challenge for Africans, the donors, and the IARCs. Technology development and transfer must be viewed in a systems context, both within countries (links between NARSs, universities, and the private sector) and internationally (links between NARSs, regional research systems, and the IARCs).

Priority Issues

1. Priority Setting

Many African TDT institutions have too many programs. Their resources are spread too thinly to achieve high-quality, sustainable programs. All indications are that resources will not increase, making priority setting essential. Current financial crises provide an opportunity to bring both focus and discipline to national research systems.

Better mechanisms are needed for priority setting. Priority setting involves decisions about both the relative payoff of alternative research approaches and the mandate of public research institutions.

A systems approach is helpful in assessing the relative merit of various activities and establishing priorities. The approach needs to be broad enough to cover the full range of agricultural activities—production, marketing, input supply, processing—and to allow decision makers to identify key constraints and high payoff opportunities. The commodity system approach has proved helpful in identifying subsector constraints, but cross-commodity themes may need to be integrated with commodity systems analysis, especially in the area of resources sustainability and household decision making.

Issues related to the purpose and mandate of public research institutions are likely to reflect political responses to pressing social and economic issues. Policy dialog may be important in helping to clarify the issues for which additional research is an appropriate response and issues

that might better be addressed through other instruments of social and economic policy.

In particular, workshop participants concluded that **increased attention should be given to priority setting for TDT investments** that help to:

- select topics, commodities, and cross-commodity themes in the regional and national context to support agricultural transformation and sustainable growth;
- give attention to elimination of binding constraints (production, marketing, processing) within a subsector;
- support technologies with promising impacts on incomes, food security, and environmental sustainability; and
- foster linkages among national, regional, and international research systems.

2. Enabling Environment for Sustainable Research Systems

Donors have invested heavily in developing the human capital for national research systems. These investments have succeeded in creating a larger cadre of trained researchers who often return to institutions that are unable to effectively utilize their skills and realize their potential. Over the next decade, a sustainable financial and institutional base must be developed to support the investments in human capital made over the last decade.

The NARSs are the building blocks for sustainable research systems in Africa, but they face constraints such as weak financial management systems, obsolete public statutes, and difficulties linking research with market and development challenges. An emerging consensus among Africans and donors suggests that creating a more enabling environment must include the revitalization of the NARSs and the development of new, effective modes of regional cooperation. African leadership and management of these efforts is essential.

Workshop participants encouraged**the establishment of an enabling environment for African scientists to improve the efficiency and sustainability of regional and national agricultural systems.** Establishing an enabling environment would involve:

- reforming research and policy institutions;
- creating financially sustainable funding mechanisms; and
- developing and sustaining human resource capacity.

3. Research Systems for the 21st Century

One of the workshop participants stated the challenge succinctly: "We must avoid the trap of using hindsight to redesign or fine tune the research institutions we wish we had had in the 1970s and the 1980s." The world is changing in fundamental ways, and there are new challenges that deserve attention in the design of agricultural research institutes.

One major challenge is to make research systems more demand driven, enabling them to respond to market demands with profitable and sustainable technologies that support economic development. Demand-driven systems require openness to diverse interests in the agricultural system (for example, farmers, the private sector, and universities) and the capacity to maintain continuity while integrating new demand-driven research thrusts into the research agenda.

At the same time, research systems must develop new capabilities to develop and disseminate technologies to support environmental sustainability. The need for environmentally sustainable technologies may arise from environmental conditions or problems, rather than from current market demand; indeed, market signals may not accurately reflect social costs and benefits. Technologies that help sustain productive environments may require research in heterogeneous agroclimatic zones and the involvement of a wide range of local institutions in dissemination.

Research systems must also establish effective regional cooperation to support more open, environmentally focused research institutions. Regionalization will entail not only more attention to ecoregional zones but also the development of management and decision-making mechanisms to support regional research and link these programs back to the work of both NARSs and IARCs.

A final challenge is to effectively link African research systems into the rapidly changing global research network, including links to new research areas such as biotechnology.

Workshop participants encouraged the **development of research systems and technologies for the first decade of the 21st century**, including attention to:

- achieving balance between productivity and conservation;
- increasing pluralism in development by reaching a more diverse clientele;
- regionalization; and
- identifying new technology needs.

4. Commercialization and Transfer of Technology

Ways must be found to make technology development and transfer more results-oriented so that researchers (public and private) have incentives and mechanisms to transfer profitable and sustainable technologies. Establishing new incentives may involve altering institutional norms (for

example, rewarding researchers for the impact of their technologies rather than simply for the publication of research results) or changing policies and legal practices to facilitate commercialization. It is also important to determine the current technological frontier in African countries and to try to assure that technology development and transfer systems are operating at or near it. In the commercialization and transfer of technology, public/private collaboration will be important on the national, regional, and international levels.

Workshop participants encouraged **increased attention to the transfer of known and emerging technologies**, through:

- commercializing technologies and improving the enabling environment for this to happen;
- increasing the involvement of nongovernmental organizations and private and public sector institutions in the dissemination of technologies and information regarding them; and
- improving mechanisms for exchanging technologies among regions and countries.